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10. The numerical application of (18) is in practice very simple and convenient. For example, let $r = 1{\cdot}5$, $r' = 1{\cdot}51$, and $c = 0{\cdot}15$, and let us calculate the time-interval corresponding to these values * of a : 1·55, 10, 400 and infinity. We obtain the following results :—

a.	Period. Years.	$\frac{1}{2}\epsilon$.	$\frac{1}{2}\delta$.	$t'-t$. Days.
		° ′ ″	° ′ ″	
1·55	1·93	45 33 16·26	42 46 47·55	10·549300
10	31·6	16 19 26·55	15 30 33·49	7·865279
400	8000	2 32 49·630	2 25 23·236	7·570711
∞	∞	...	...	7·563420

In all these cases the second term on the right of (18), or (20) in the case of the parabola, could be calculated by 4-figure logarithms. Further, the value of log A was 0·0005 in the first case, and negligible for the other two elliptic orbits. The form (18) will always give accurate results, and the advantage which it offers becomes most conspicuous in those cases which have been considered to present the greatest difficulty.

University Observatory, Oxford :
1906 *June* 4.

Errors of Tabular Place of Jupiter, from Photographs taken with the Astrographic 13-*inch Refractor of the Royal Observatory, Greenwich.*

(*Communicated by the Astronomer-Royal.*)

In communicating the results of measures of photographs of the sixth and seventh satellites of *Jupiter* it was pointed out that in deducing the position angle and distance the error of the tabular place of *Jupiter* had been neglected.

To eliminate this error, and also that arising from any systematic error of the catalogues employed, a series of photographs of *Jupiter* was taken with the astrographic 13-inch refractor, with exposures only just long enough to give good measurable images of the known stars, *i.e.* 30^s.

In all ten photographs, taken between 1905 November 3 and 1906 February 15, have been selected and measured. Four images each of *Jupiter* and of about twelve stars were measured on each plate, the positions of the stars being derived from the *Astronomische Gesellschaft Catalogue* (Berlin zones). The deduced positions of *Jupiter* are thus affected by any systematic error of the catalogue and the error due to twenty-five years' unknown proper motion of the stars ; but, as the positions of the satellites, deduced in the same manner, are affected by the same errors, it

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* For two methods of calculating $t'-t$ for the case $a = 10$ see Bauschinger's *Tafeln*, pp. 32, 33.

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follows that this is the proper place of *Jupiter*, with which the places of the satellites should be compared.

The stars on the photographs were measured in the duplex astrographic micrometer, but, as the division errors of the microscope scales have not yet been determined, *Jupiter* was measured in the *Eros* micrometer. Corrections for division errors of the scale and of the réseau have been applied to the measures of *Jupiter*.

The tabular errors so obtained are given below, together with those obtained from fundamental observations made with the Transit Circle and with the Altazimuth.

Errors of Tabular Place (*T* − *O*)

Astrographic.				Transit Circle.			Altazimuth.		
1905.	Position of Telescope.	R.A.	Dec.	1905.	R.A.	Dec.	1905.	R.A.	Dec.
		s	″		s	″		s	″
Nov. 3	W	−·13	−0·2	Sept. 18	−·07	−0·5	Sept. 18	−·14	−1·5
21	W	−·07	+0·8	Oct. 16	−·10	0·0	Oct. 19	−·01	+0·3
23	W	−·05	+0·7	27	+·03	+0·7	Dec. 2	−·07	−0·2
29	W	−·09	+0·8	31	−·18	...	1906. Jan. 5	−·19	−0·7
1906. Jan. 19	W	−·02	−0·1	Nov. 2	−·13	−0·7	8	−·07	−0·6
19	E	−·03	−0·7	6	...	−2·2	10	−·03	−2·1
23	E	−·04	−0·6	7	+·05	−0·6	24	−·07	−0·6
29	E	+·01	−0·6	15	+·02	+1·4	Feb. 5	−·14	+0·3
Feb. 14	E	−·03	0·0	21	−·03	−0·1	9	−·02	−2·1
15	W	−·03	−0·1	23	−·06	−0·5	20	−·11	+0·5
				24	−·07	+0·4	21	−·09	−0·8
				27	−·05	+0·3			
				29	−·02	−0·9			
				Dec. 2	+·03	+0·7			
				8	−·07	−1·2			
				9	−·04	0·0			
				1906. Jan. 5	−·08	−1·3			
Mean ...		−s·048	0″·00		−s·051	−0″·29		−s·085	−0″·68

It should be noted that the photograph on November 3 is very unsatisfactory.

A correction of −″·36 for R−D has been applied to the declinations observed with the Transit Circle; of +″·48 to those with the Altazimuth on September 18 and October 19, and of −″·13 to the remainder.

Royal Observatory, Greenwich:
1906 *June* 7.

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Results of Micrometer Measures of Double Stars made with the 28-inch Refractor at the Royal Observatory, Greenwich, in the year 1905.

(*Communicated by the Astronomer Royal.*)

The measures were made with a bifilar position-micrometer on the 28-inch refractor, focal length 28 feet. The power generally employed was 670. When bright stars were observed a blue glass shade was usually employed to diminish the light and irradiation. The observations were made in variously coloured fields or in a dark field with illuminated wires. The initials in the last column are those of the observers, viz.

L.	Mr. Lewis	H.F.	Mr. Furner.
W.B.	Mr. Bowyer	Bk.	M. Van Biesbroeck.

M. Van Biesbroeck, of Brussels, spent some time at the Observatory, studying the details of various departments. On nights when the definition was not sufficiently good for measuring stars in the ordinary working list the time was spent in measuring stars from a supplementary list made up of Struve stars which have been neglected, or which require periodical observation at intervals of ten years or so, and of miscellaneous stars in which the companion is very faint. As measures of such pairs are not of immediate interest a list only of the stars observed is given here, the publication of the measures, as well as of the individual results of the observations of the other stars, being reserved for the volume of *Greenwich Observations* for 1905.

In general the present list of measures is confined to stars of which the separation is under 4″, or which show orbital movement.

Stars in the Supplementary List observed in 1905.

Struve Stars.

Σ 1955
1953
1963
1964
1977
1992
2003
2005 AC
2008
2032 AC
2040
2095
2104
2109
2110
2115
2113
2142

Σ 2137
2140 AB
2140 AC
2188
2201
2202
2213
2211
2217
2224
2228
2232
2233 AC
2233 AD
2264
2269
2295
2311

Σ 2336
2327
2364
2376
2381
2385
2390
2396
2424
2426
2530
2585
2618
2622 AB
2622 AC
2631
2633
4263

Σ 2655
2664
2679
2680
2686
2691
2688
2692
2700
2702
2708
2709
2713
2714
2715
2718
2722
2725

Σ 2734
2736
2738
2761
2763
2831
2833
2848
2852
2867
2877
2890
2897
2898
2902
2910
2916 AB
2916 AC

Σ 2931
2932
2941
2946
2992
3014
3018
3021
3028
3039
3042
3044
3055
3058
3097
3132
3134